

# 2014 Urban Construction Initiative Annual Meeting

*City of Lynchburg*



# Materials Testing Requirements for Locally Administered Projects

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# Materials Testing Requirements

*FHWA/State Testing Requirements*

*Frequency of testing*

*Flexibilities for smaller projects*

# FHWA/State Testing Requirements



## FHWA/State Testing Requirements (Continued)

All Federal-aid projects on the NHS are subject to quality assurance procedures (23 CFR 637). This includes LPA-administered projects. For projects off the NHS, States and LPAs can use established procedures approved by the STATE DOT for materials acceptance. State and LPA procedures used for non-NHS projects must satisfy the intent of Federal requirements.

## FHWA/State Testing Requirements (Continued)

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Materials testing and documentation is the responsibility of the LPA through its Project Manager (PM) and the Project Construction Engineer (PCE).

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Required inspections and tests shall comply with the, contract requirements, approved plans, LAP Manual, VDOT Road and Bridge Specifications, Virginia Test Method (VTM), VDOT Materials Division Manual of Instruction (MOI), as necessary.

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Contract requirements take precedence, where they are more stringent.

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## Applicability...

These requirements apply to VDOT-funded projects which will be maintained by VDOT and any federal-aid project.

Federal-aid projects on the NHS may have additional requirements not specifically identified in the LAP Manual and additional requirements will be identified during preliminary planning and the development of the Project Administration Agreement.

These provisions are encouraged for non federal-aid projects which will be maintained by the LPA.

# Frequency of Testing

It is the LPA's responsibility to verify that field and laboratory sampling and testing are performed using the proper procedures and at the frequencies specified in the minimum requirements outlined in the contract specifications.

Frequency will come from Appendix G of the LAP Manual, the current VDOT Materials Manual of Instructions (MOI), and other documents specified in the Contract or approved by the Department

Appendix G of the LAP Manual - QC/QA/IA Frequency Table – Specifies the required frequency for QC, QA and IA during production for various material types, gives the test reference and specification sections.



# Flexibilities for Small Quantities



## Flexibilities for Small Quantities

The Department may elect to allow the LPA to accept small quantities of materials without normal sampling and testing frequencies.

An item can be accepted as a small quantity if the proposed project quantity for a specific item is less than one subplot or one-half of a subplot for similar materials.

## Flexibilities for Small Quantities

Factors the department will consider prior to use of small quantity acceptance are:

- Has the material been previously approved?
- Is the material certified?
- Is there a current mix design or reference design?
- Has it been recently tested with satisfactory results?
- Is the material structurally significant?

# Quality Assurance Testing Plan

*What it is*

*When the plan is required*

*Any flexibility based on size/scope of projects?*

# Quality Assurance Testing Plan

The QA/QC Plan defines the organization, work processes and systems necessary to provide confidence and objective evidence that the design and construction of the facilities, components, systems, and subsystems that make up the project.

### Content.- Minimum

- QA/QC organization with specific responsibilities.
- List by discipline the name, qualifications, duties, responsibilities and authorities for all persons.
- List current and relevant certifications for technicians; Demonstrate how QA and QC activities will be reflected in the project progress schedule; Produce submittal schedule integral to Work Package requirements.
- Detail inspection requirements.

Continued...

Continued...

- Provide Quality Control and Quality Control sampling, testing and analysis plan with frequencies, location and methods.
- Describe procedures for instrumentation and survey monitoring.
- Describe procedures for load testing; Identify the accredited laboratory(ies), Provide current certifications. Specify documentation for QA and QC activities.
- Demonstrate procedures to meet the Department's requirements for corrective action when QA/QC criteria are not met.

## When the Plan Is Required

- In accordance with 23 CFR 637.205, an Independent Assurance Program, to include independent verification testing, is required for any construction project on the NHS. It is also a VDOT requirement for any project on a Primary Route. When an LPA has been authorized to administer a project on the NHS or on a Primary Route, the LPA will act as VDOT's designated agent and shall be responsible for all IA testing for the project. The LPA will be required to submit a project specific quality assurance plan (QAP) that includes how IAST (Independent Assurance Testing) will be accomplished.



## When the Plan Is Required

- A QAP is required on P3 Projects and Design Build Projects because of the unique contractual relationships between the owner, D-B Contactor, design consultants, and construction contractors. The QAP for these project must be submitted at the kickoff meeting (5-10 of LAP Manual).

# Quality Assurance Testing Plan

*Flexibilities Based on Size/Scope of Projects*



## Flexibilities Based on Size/Scope of Projects

- For federal-aid projects off the NHS or for projects that will be maintained by VDOT, the LPA may submit an alternative materials quality assurance plan (QAP) for review and approval, prior to construction.

## Flexibilities Based on Size/Scope of Projects

- VDOT understands that LPAs maintaining their own road system have a vested interest in ensuring the quality of construction for their project.
- VDOT can perform an advisory role to the LPAs regarding materials quality assurance on these non federal-aid projects.

## Flexibilities Based on Size/Scope of Projects

- Materials acceptance and assurance sampling and testing for projects that do not include federal-aid and will be maintained by the LPA will be performed in accordance with contract documents, which will conform to the LPA's quality assurance plans.

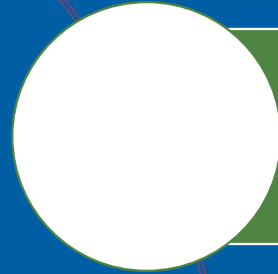
# General Information

*Areas of concern on local projects*

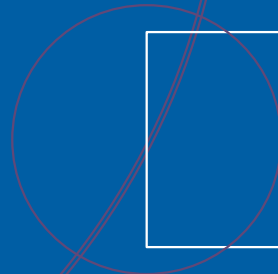
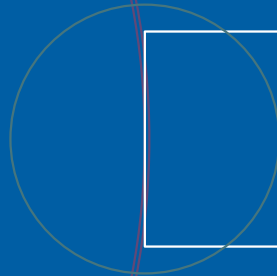
*Items that localities should be aware of*

*Best practices to share*

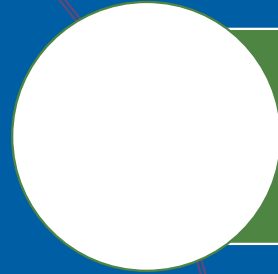
# Areas of Concern on Local Projects



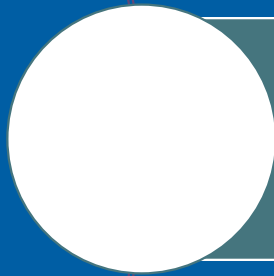
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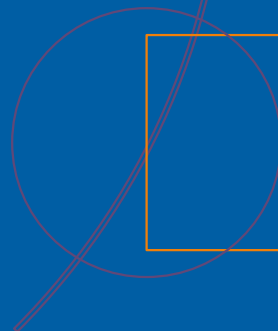
# Areas of Concern on Local Projects



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Compliance reviews has found that construction quality is highly variable, and the quality and availability of records make it difficult to verify compliance.





# Areas of Concern on Local Projects



One area of concern is oversight of construction quality.

Compliance reviews has found that construction quality is highly variable, and the quality and availability of records make it difficult to verify compliance.

Material testing is often either not done or is undocumented leaving project quality and durability questionable.

## Areas of Concern on Local Projects (Continued)

Even where consultants are used to accomplish materials sampling and testing work, there is a need for more basic knowledge within the LPA so they know what services they should be buying and what documentation should be incorporated in the project records.

Many reviews reveal that little evidence of quality assurance testing documentation exists in local files.

Construction quality assurance practices on many locally administered Federal-aid projects are in need of improvement.

# LAP Manual Chapter 13

## *Project Delivery Checklist*

F	S-V	S-L	Requirement	Chapter/ Section
Chapter 13.2 Materials Assurance				
X	X	--	Source of materials documentation	13.2.3
X	X	--	Identify need for VDOT support for source inspections or prefabricated materials inspections	13.2.4
X	X	--	Materials acceptance technicians certified; records of certified inspectors maintained	13.2.5
X	X	--	Materials notebook initiated and maintained (or included in project documents) throughout project (23CFR635.123)	13.2.7
X	X	--	Sign Inventory created and submitted	13.2.10
X	X	--	Local tracking numbers established for materials accepted by manufacturer certification	13.2.10
X	X	--	Independent assurance plan developed and samples collected for NHS projects	

# Conclusion

Failure to ensure proper materials quality assurance and lack of adequate project records can lead to poor quality construction and can also result in costly work orders and claims – all of which can lead to projects that are behind schedule and over budget.

Density and  
Compaction  
Discussion

Bill Wise

Lynchburg District VDOT Quality  
Assurance Manager.



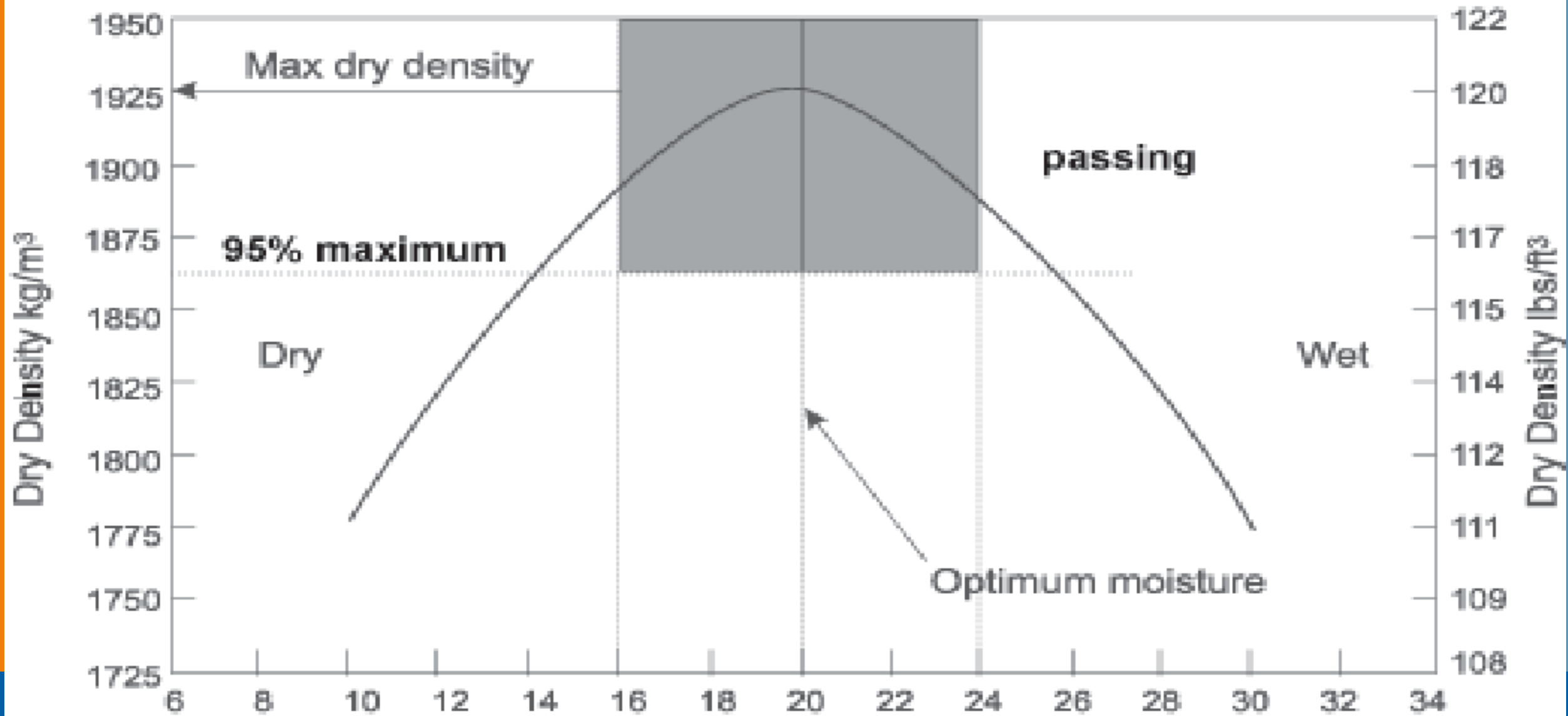
# Compaction and Density Testing

The LAP Manual states in Section 13.1.5.3 that  
*“Materials Acceptance and Assurance Sampling Testing is required in accordance with the contract documents, VDOT Materials Manual of Instructions, and Chapter 13 of this manual, with contract requirements taking precedence, where they are more stringent.”*

# Compaction Basics



# Soils and Aggregates



# Asphalt

By pressing the aggregate particles closer together into a position in which the asphalt binder can hold them in place, compaction accomplishes two important goals:

1. It develops the strength and rut resistance of the mix
2. It closes passages through which water and air would otherwise penetrate thus causing faster aging, freeze-thaw damage, and stripping.

# Density Testing

# Top Five Reasons to Run Density Tests

#5 Helps insure a safer riding surface.

#4 Identifies problems in the construction of the embankment, pipe backfill or typical section.

#3 Proper compaction  
lessens wear and tear on  
the travelling public.

#2 Proper compaction  
decreases future  
maintenance issues and  
costs.



#1 Encourages the contractor to put forth the proper effort to build a quality product.

Top Five Reasons that  
density tests are not run.

#5 They don't make us  
do it in (fill in the blank)  
District.

#4 Certified technician  
was unavailable and the  
area was covered up.

#3 “We don’t have time for this. You’re holding me up.”

#2 “Our bid didn’t include testing.”

#1 “Huh? We didn’t know we had to test.”

# Past Issues With LAP Testing

Contracted engineering firm had no experience with highway projects.

Contracted engineering firm did not communicate testing requirements to contractor.

Contracted engineering firm did not utilize Road & Bridge Specifications, Virginia Test Methods, or the Manual of Instructions when formulating their bid.

Contractor assumed project was to be handled as private, not state work.



# Past Issues With LAP Testing

Test locations were not precisely reported in regards to station, offset and elevation.

Test results were not compared to specifications.

Failing test sections were not addressed by the contractor and/or technician.

Technician did not follow Virginia Test Methods, Manual of Instructions, Road & Bridge Specifications and Chapter 13 of the LAP manual.

# Evidence of Poor Compaction















# Worst/Best Excuse For Not Testing

“Hopefully, it’ll last long enough for me to reach retirement.”